DOCUMENT RESUME

ED 306 142 SE 050 556

AUTHOR Walter, Martha L., Ed.
TITLE Communicating Science to the Public. Mass Media and Science: Worlds at Odds? A Panel Discussion
INSTITUTION Michigan Univ., Ann Arbor. Michigan Sea Grant Coll. Program.
SPONS AGENCY National Oceanic and Atmospheric Administration (DOC), Rockville, Md. National Sea Grant Program.
REPORT NO MICHU-SG-87-900
PUB DATE Dec 87
GRANT NA-86AA-D-SG043
NOTE 44p.; Panel discussion presented at the Conference on Great Lakes Research sponsored by the International Association for Great Lakes Research (30th, Ann Arbor, MI, May 11-14, 1987).
AVAILABLE FROM Michigan Sea Grant Communications, 2200 Bonisteel Blvd., The University of Michigan, Ann Arbor, MI 48109 ($2.00).
PUB TYPE Speeches/Conference Papers (150)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Adults; Information Dissemination; *Information Sources; *Mass Media; *Public Education; Publicity; *Science Education; *Scientific Concepts; Scientists

ABSTRACT

Recent studies have revealed that a large percentage of the public believes that science is of great importance, but that the public's basic science knowledge is woefully lacking. These studies highlight a vexing problem: how can scientists, through the mass media, enlighten the tax-paying populace to their work, given that a sound foundation in basic science is broadly lacking? A panel discussion focused on improving the scientist/reporter interaction so that an interested, but basically unknowledgeable public, might better understand what happens behind laboratory doors, and gain greater appreciation for why the scientists' work is important and how that work might affect them. This publication contains the complete transcript of the 90-minute discussion, including comments and questions from the audience. The transcript was edited to improve readability; every effort was made to retain the import of each person's comments. (CW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED306142

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Mildred Flory

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE 051 556

...on cleanup efforts.

"It's time to act. Research can only go so far," said Trefor Reynoldson, a scientist with Environment Canada's National Water Re...

Can't be complacent about Lakes quality

The good news is that the water quality of Lakes Superior, Michigan, Erie and Ontario is noticeably better today than it was in 1971. The bad news is that Lake Huron is missing from the "improved" list.

A survey commissioned by the Michigan Sea ...ant Program revealed that Lake Huron hasn't ...ne downhill, though. It simply was as high in ...ality 16 years ago — and remains at about that ...el — as Lake Michigan is today after substantial ...provement.

...l rating of Lake Huron's water as "...edium" today was made ... ...pondents. That's ... the ...

...rvey: Great Lakes ...pear to be cleaner

...E ASSOCIATED PRESS

...ARBOR — The water quality ...lakes Superior, Michigan, ...nd Ontario is noticeably bet... ...an it was in 1972, while Lake ...'s is about the same, accord... ...a survey of government offi...

...e survey is based on responses ...m more than 400 shore-line gov... ...mental units in eight U.S. ...es and two Canadian prov...

...medium or good, more than do... ...the 30 percent who thought ... ...1971.

On Lake Ontario, 71 perce... ...sponded favorably about ...quality, 21 percentage points ...er than in 1971. For Lake Mi... ...87 percent responded favora... ...crease of 14 percentage ... And 96 percent spoke well ... Superior's water, an impro... ...of 4 percentage points.

...akes conference (...leanup vs. clamp

...W BOB CAMPBELL ...Free Press Staff Writer

ANN ARBOR — Scientists clashed Tuesday on whether they should advocate clampdowns on Great Lakes pollution or cleanup of pollution hot spots ... the federal, ... — to reduce ... enormous c... in the river ... PCBs, c... been linked ...ioral prob... studies, a... concern i...

Great Lakes mismanag...

...FROM THE ASSOCIATED PRESS

Most officials, academics and ...vic leaders surveyed in a Michi... ...an Sea Grant College Program ...tudy said the Great Lakes are in... ...dequately managed by public ...gencies.

...akes undermanaged, ...ot mismanaged

While I appreciate your Nov. 18 ...overage of my recent University of Michigan study on Great Lakes ...management organizations, I am ...ompelled to take issue with the ...nfortunate and misleading title given the article ("Great Lakes mismanaged, ...experts say"). I fear ...

Michigan, who co... ...vey.

The survey of ... Great Lakes states ... regional institution... ...tional Joint Com... Lakes Commissio... Great Lakes Gover... ...tates, ... U.S.-Canada ...

In my study ... experts inter... agree that th... Lakes regio... needs streng... various inst... need of som... the experts ...

...tudy says Grea... ...quality improv...

ANN ARBOR — Government ...fficials in eight U.S. states and ...wo Canadian provinces, ...esponding to a new University of ... perceived ... and graduat... MacKenzi... Anambutr.

The U-M r... past year ob...

COMMUNICATING SCIENCE TO THE PUBLIC

Mass Media and Science: Worlds at Odds?

Michigan Sea Grant College Program
MICHU - SG - 87-900

BEST COPY AVAILABLE

PANELISTS

Moderator

Martha Walter, Communications Co-Manager
Michigan Sea Grant College Program
Ann Arbor, Michigan

Media

Frank Blanchard, Senior Science Writer
News and Information Services
The University of Michigan
Ann Arbor, Michigan

Robert Campbell, Environment Writer
Detroit Free Press
Detroit, Michigan

Ellen Rogers, Health and Science Reporter
WILX Television
Lansing, Michigan

Bill Turque, Detroit Correspondent
Newsweek Magazine
Detroit, Michigan

Scientists

Harold E.B. Humphrey, Science Liaison Coordinator
Michigan Department of Public Health
Lansing, Michigan

Frank Quinn, Head, Lake Hydrology Group
Great Lakes Environmental Research Laboratory
National Oceanic and Atmospheric Administration
Ann Arbor, Michigan.

Marie Sanderson, Director
Great Lakes Institute
University of Windsor
Windsor, Ontario

Peter Sly, Research Scientist
National Water Research Institute
Canada Centre for Inland Waters
Burlington, Ontario

COMMUNICATING SCIENCE TO THE PUBLIC

Mass Media and Science: Worlds at Odds?

A Panel Discussion

Organized by the Michigan Sea Grant College Program

30th Conference on Great Lakes Research
International Association for Great Lakes Research

The University of Michigan
Ann Arbor, Michigan
May 11-14, 1987

Edited by Martha L. Walter

MICHU-SG-87-900

December 1987

CONTENTS

Preface	v
Acknowledgments	vi
Summary	vii
Panel Discussion	1
Biographical Sketches	23
Bibliography	27

PREFACE

The panel discussion on "Communicating Science to the Public" was held May 13, 1987, at The University of Michigan in Ann Arbor, Michigan, as part of IAGLR-87, the 30th Conference on Great Lakes Research of the International Association for Great Lakes Research. The panel was organized by the Michigan Sea Grant College Program.

The purpose of the media/scientist panel discussion was to provide media representatives and scientists the opportunity to explore (a) the frustrations each faces when dealing with the other, and (b) how each might change their respective approaches to facilitate accurate, efficient scientific information transfer to non-scientific audiences.

Recent studies have revealed that a large percentage of the American public believes that science is of great importance, but that the public's basic science knowledge is woefully lacking. These studies highlight a vexing problem: how can scientists, through the mass media, enlighten the tax-paying populace to their important and often fascinating work, given that a sound foundation in basic science is broadly lacking?

This panel discussion focused on improving the scientist/reporter interaction so that an interested, but basically unknowledgeable public, might better understand what happens behind laboratory doors, and gain greater appreciation for why the scientists' work is important and how that work might affect them. Quality science reporting is essential to developing such an informed public, and is the responsibility of both the reporter and the scientist. The panel discussion was designed to enlighten both reporters and scientists to the constraints and frustrations experienced by the other and to air possible solutions.

This publication contains the complete transcript of the 90-minute discussion, including comments and questions from the audience. The transcript was edited to improve readability; every effort was made to retain the import of each person's comments.

The Michigan Sea Grant staff hopes that both reporters and scientists will find the points made in the panel discussion useful as they pursue their respective disciplines, which inevitably bring them into contact with one another. We hope too that these professional contacts may increasingly involve mutual respect and assistance, with a better-informed public the beneficiary.

M. L. W.

ACKNOWLEDGMENTS

This panel discussion was the outcome of a seed planted by R. Stephen Schneider, Science Writer, Great Lakes and Marine Waters Center, The University of Michigan.

The panel was made possible by the cooperation of the co-chairs of the 30th Conference on Great Lakes Research: Marlene Evans, Associate Research Scientist, Great Lakes Research Division, The University of Michigan; and Brian Eadie, Head, Synthetic, Organic, and Particle Dynamics Group, Great Lakes Environmental Research Laboratory, Ann Arbor, Michigan. The assistance of Ann Pendleton Tully, Program Coordinator, University of Michigan Extension Service, is also appreciated.

The expert services of Access Productions, Ann Arbor, Michigan, were essential to the smooth conduct of the panel discussion and the existence of this transcript.

Several Sea Grant staff made major contributions towards organizing and publicizing the panel discussion and producing this proceedings. They are Kurt Byers, Editor/Writer; Millie Flory, Communications Co-Manager; Russell Moll, Assistant Director; and Debra Bogi, Communications Secretary.

The willing and thoughtful participation of the panelists was the key that made the panel discussion the success that it was. The deepest appreciation is extended to each.

SUMMARY

This summary lists major points raised in the panel discussion. They do not necessarily reflect the consensus of the group; they are points that were either discussed at some length, revealed particularly interesting insights into reporters' or scientists' outlooks, or provided useful guidance on the issue of communicating science to the public. This summary cannot capture the excitement and stimulus of the panel discussion, but rather is intended to orient the reader to the discussion and to serve as a review.

- Both scientists and the media have an obligation to inform the public of scientific findings. They also have an obligation to present the information accurately, clearly, and interestingly.
- Good reporting of science in the media could result in an interested public exerting pressure on government officials to increase funding for research.
- When a scientist cannot divulge all the information at hand because it is extremely preliminary or may jeopardize the privacy of individuals on whom a study is being conducted, he/she should still be forthcoming with what information is available; often there is enough information to make a useful media report.
- Scientists should not tell the reporter things that are "off the record." Most reporters will respect confidences, but there are some who do not. Also, an interview littered with, "that's off the record," can confuse a reporter.
- Scientists must bring reporting errors to the attention of the medium that published/broadcast them. Often post-facto corrections will be made.
- Scientists need to develop the ability to communicate their findings in layman's terms. This would include:
  - establishing a context for their findings,
  - relating their findings to the everyday life of the public, and
  - observing if the reporter interviewing them seems puzzled.
- Scientists should make themselves available to the reporter to check the accuracy of the story. Many good reporters do this habitually, although deadlines sometimes prevent it.
- Both reporters and scientists are troubled by the inaccurate headlines that are sometimes tacked on an accurate story. Headlines are written by headline writers, not the reporters. The headline writers are faced with the difficult task of boiling down a lengthy story into a few words and, in addition, are under pressure to write something catchy.

- Reporters are constrained by deadlines and by the fact that many "science" reporters have other beats to cover. While these problems could be relieved if media management gave greater attention to in-depth reporting, scientists must also realize that they cannot expect a media article or broadcast to express the refinement of a professional journal article that has undergone months of editing and peer review.
- It is important for scientists to reach out to reporters, and not just wait for reporters to come to them.
    - In the case of a scientific conference, the organizers could provide the press with a preview of the presentations, either through written summaries or a press conference.
    - In the case of individual scientists, they can:
        - contact the public information office of the institution where they work, or
        - send the media a press release or other written synopsis, perhaps followed up by a phone call to ensure it reaches the right person.
- However, scientists need to avoid being press freaks; the motivation for wanting to get a story published should be to provide the public with interesting and useful information, not self-aggrandizement.
- Reporters need to realize that it is important to the scientists who take the time to have an interview to be credited and to have their institution credited.
- It would be useful to have professional development conferences or courses for the media in science writing and for scientists in communications. This might be arranged on a sabbatical or interchange basis, or through workshops at professional conferences.

COMMUNICATING SCIENCE TO THE PUBLIC

Mass Media and Science: Worlds at Odds?

A Panel Discussion

Do scientists and/or the media have an obligation to inform the public of scientific findings? What are the advantages or disadvantages to researchers, media and society of doing this?

Martha Walter -- Our list of discussion topics states that the purpose of the panel is to determine how scientists and media representatives can facilitate accurate reporting of science issues. Implicit in that purpose is Michigan Sea Grant Communications' bias that reporting science issues is important. Some people may question that. I think this is the basic question we want to address first--or, as stated in our first discussion topic: do scientists and/or the media have an obligation to inform the public of scientific findings, and what are the advantages or disadvantages to researchers, media, and society of doing this?

Peter Sly -- I think there is no doubt at all that there is an obligation on the part of scientists to inform the public of scientific findings. I think reporters have an equal obligation to not make a much larger issue of something than it really merits. I think this is where we find a dilemma, because once we open Pandora's box a lot of other forces come into play.

For example, nutrients is a topic which to us is of continuing involvement--perhaps not on a daily basis, but certainly quite often on a monthly, bi-monthly, or yearly basis. There are advances in our knowledge of processes or of events in different places which help us develop our understanding. Now this gradual development of understanding may not be important to the media and can be extremely boring to the public, particularly if the public is continually bombarded with the same discussions or topics.

I think one of the difficulties is that we tend to try to find new images or new reasons why something should be considered important simply to retain a media image or at least to meet the interest of the press. This is our first pitfall. I don't think that we should do this. You learn after some years of experience that silence can be extremely golden. There is nothing so much that is wanted by the press as something it can't get, and if it gets a voluble scientist it soon tires of that scientist.

We've all made our major boo-boos in the past, but I think that we are learning to cope with the expression of ideas and information to the press. I think that we can't deny this obligation, but it is one that we have to temper. We have to educate not only ourselves, the members of the profession, but we must also educate the media as to what they can and should expect. We really haven't been involved in media relationships as a profession for that long, at least not to the kind of exposure that we have been having over the last decade or so. I can remember 20 years ago nobody would read an article about the environment, and the press didn't care. There were far more important things to talk about. Now, environmental issues have been raised considerably, and much to our benefit, because they attract political attention and this brings in dollars and keeps us in business. But I think equally we have to guard very carefully, as the medical profession is finding out and as I heard recently on an

extremely interesting broadcast over PBS about relationships between the press and the scientist. It is very dangerous to oversell yourself and oversell your product. An awful lot of people are coming unstuck in the process.

Marie Sanderson -- I would agree that it is our duty to enable the media to inform the ordinary population what we're finding out as far as environmental science goes. At a meeting last night of the East Michigan Environmental Action Council, a public action group, two members said to me that it is the duty of the media to keep us informed about these things.

Ellen Rogers -- I think we have another duty to present scientific information as clearly, concisely, and interestingly as possible. That can be a problem because, as you mentioned, a lot of people don't want to listen to it. It's our job to make them listen to it, but we also have an obligation to our advertisers--and they pay my salary. I don't think that makes me choose a certain story, but there are a lot of things people don't want to listen to, yet we have an obligation to inform them.

Harold Humphrey -- Let me throw an anchor into this discussion. Sometimes I can't tell you everything. There are times that, as a responsible public health scientist, I should not give full disclosure to the media. The perspective I come from is one where we are trying to evaluate populations of people who may have been impacted by some environmental event or a specific toxic chemical exposure. To solicit the kind of cooperation we have to have with these individuals--mothers, their children, fathers--we have to protect the confidentiality of the information they are providing to us, and the nature of that information cannot be revealed to the press. This creates a problem because, if there is some sort of a study going on, this attracts interest. The public in general is quite curious about what everybody else is doing or what is happening to so-and-so in such-and-such a town. We also have to realize that data on human beings has to be carefully weighed and measured before it is made public, so that misinterpretation or undue hysteria doesn't take place as a result of preliminary evidence or partial or inconclusive findings. So I add the perspective to this discussion that there are times when certain types of scientific information are difficult to share with the press and at times may even have to be held back.

There are times when certain types of scientific information are difficult to share with the press and at times may even have to be held back.

Ellen Rogers -- I have a response. I think the press would like the information that you can give. A lot of times we're just looking for something to nibble on. I think a lot of scientists/researchers feel that if they can't give reporters all the information, they shouldn't give them any of it. Then reporters have to rely on getting the information from other sources that may not be as good as the scientist doing the research. That's a hardship because a reporter doesn't need all the information to make a story--I can pass along what information I have. I would rather have all the information

and all the facts, but sometimes we see a story in that you won't give us anything. A "no comment" is a story. And then...

Harold Humphrey -- ...And then our dilemma has really become a problem because we get into the institutional problems of so-and-so works for such-and-such an institution or government agency and therefore by definition is probably hiding something or holding back. When in fact that may not be the case.

Ellen Rogers -- But if you give me a "no comment," it looks like you're hiding something, and it will look like that to the public when I say that this official has "no comment".

Bill Turque -- I would hate to think the State of Michigan as a matter of policy is withholding significant public health information from people. I think there is always going to be an inherent conflict between officials of any government agency and the press because we are always going to be pressing for more and more information. I think part of the problem is the nature of science. Reporters are always looking for that which is definitive, unambiguous, clear, conclusive, and that's not always the case, particularly with ongoing studies. I think scientists are more accustomed to dealing with things that are not black and white. I don't think there is any permanent solution to this problem--there's always going to be this dynamic tension.

Part of the problem is the nature of science. Reporters look for that which is definitive and conclusive, and that's not always the case.

Harold Humphrey -- It certainly should be made clear that there is not any State of Michigan policy on withholding public health information. The point I was wanting to make, however, is there are certain types of information on individual humans which is private, which we're privy to as a part of a total study. You are correct that if something is being found in a study, we are obligated to share our generic findings.

Bill Turque -- Don't misunderstand--we're not interested in compromising people's privacy, but I think you get into very dangerous ground when you start witholding information for fear it might be misinterpreted. I think that is a very slippery slope.

Harold Humphrey -- The problem when you are dealing with human populations where you cannot do a controlled experiment, is that you are dealing with interpretation of data, interpretation of findings, "grey areas" if you will, and that's food for much thought, discussion, and debate--and sometimes it's not totally constructive.

Bob Campbell -- One of the things that I've heard at this conference from many of the scientists is that there is not an adequate level of commitment from both federal governments and the Great Lakes state and provincial governments. I think that you have to look at the research that you are doing and would like to do and ask why there isn't a greater level of commitment. Maybe that has to do with public pressure, and public pressure is often created by what we as the media are able to tell the public about what is going on in

We all need to do a better job of getting scientists away from telling their colleagues about their research to telling the media what it means.

the environment. So I think we all need to do a better job of getting scientists away from just telling their colleagues about their research to telling the media what it means. Then we could see if some of that commitment from the public and from the leaders follows.

Martha Walter -- I think that raises an interesting issue. Given that information is sometimes withheld because there is fear of misinterpretation, what can be done by both reporters and scientists to minimize the possibility of misinterpretation? One problem you're faced with is having to simplify complicated information so that the general public can understand it. That can be very difficult to do and keep the information correct. Are there steps that both sides can take to minimize the chance of incorrect information being published or broadcast?

Peter Sly -- I'll turn the question around a bit and take it from the point of view of instances that reflect something of considerable significance rather than the mundane. There are occasions when we are approached by the press or are talking about something which invites further exploration by the press. This is a perfectly natural and proper thing to do. The difficulty is that you reach a point where you either say nothing more, in which case the "no comment" story erupts, or you say more than you want and you end up in hot water. There seems to be no point where you can say to the press, "Hold it. You are asking me as a individual why such-and-such a thing is occurring. I can tell you, because I know, but if I tell you it is for your information only." Usually that's not the way it works. I think there are many of my colleagues in this room who have had something go wrong because they have said something, and it's either been misconstrued or worse still, a private conversation has in fact turned up on the front page. My own career happened to go through a situation like that, and it was not a very pleasant experience. I think it jaded my opinion of the press very considerably for a number of years. If you want to understand something you have to understand that our jobs are very often on the line if it's something important and there's a very good reason why we won't explain something. It's not because we don't want to. If you press somebody beyond a reasonable point you can cause immense difficulties, not only for yourself later on but also for the people you're talking to and the way they express their feelings. You have to respect us, and I don't think we get the respect from the media that we expect from our colleagues. This just may be the way we each do our business and the way we trade information and understanding between each other. But if I say to somebody who is my friend or colleague, "Look, I'll give you some information to help you develop your experiments. Please don't release it," I usually can trust him. But that is not the case with the press.

Martha Walter -- You're dealing with really different goals; the goal of your colleague and the goal of the press are so diverse. Do any members of the press have a response to some of these concerns?

A very good ground rule is that anything that you say is on the record.

Frank Blanchard -- As far as going on and off the record with comments to the press goes, it has been my experience in dealing with some people that the conversation will be littered with "that's not for quote," or "don't use that," or "you can use this." That tends to become confusing. A good rule of thumb would be to establish ground rules at the beginning of the conversation with reporters. I think a very good ground rule is that anything that you say is on the record.

Ellen Rogers -- Don't tell us. It's as easy as that. If you don't want it used, don't say it. I don't work this way, but I do know some people who use the information you give them, whether or not you say it's on the record or off the record. Some people work that way. I think reporters push for more because a lot of times they are expecting nothing, and a lot of times they get nothing when it's possible to get something. I have had officials tell me nothing, and after I have pushed them a little, they say, "Oh yes, I can tell you that," and they go on and give me what I can use. I know that they have to go to their superiors and they have to get things checked out on what they can tell the press, but I think that we have learned from experience to push for more. My advice is to push back and to say, "No comment, I cannot tell you this, I know it but I cannot tell you."

Marie Sanderson -- Could I just tell a personal story and ask the media people if they've done anything like this? This is one time we really got into trouble at the Great Lakes Institute. It was at an IAGLR meeting actually, but the reporter isn't here so I can tell the story. We were questioned on the toxic contaminants we were finding in the St. Clair River and something was mentioned about one source. The reporter asked us after the talk to identify the source and we said that that was confidential information. Then the break was over and we headed back into the session. We thought the interview was over, but strangely enough the reporter had his tape recorder on in his pocket, and going back into the session we said, "Well, Dow Chemical would be glad to know we didn't mention them by name!" Of course the next day the paper headlined that Dow Chemical was the culprit, so we got into a lot of trouble for that. Is that a common practice among reporters?

Ellen Rogers -- I work with TV, and people know when they are on because they have a bright light shining in their faces.

Bill Turque -- It is unfortunate that there are cases where off-the-record confidences have been broken by reporters, but I would be naive to say it doesn't happen. I like to think that this is the exception rather than the rule. What Frank said about establishing ground rules before the interview is very important. I don't think there is anything that alienates a journalist more than having a long fruitful conversation with somebody in any discipline and then be told, "By the way, that's off the record." That's a surefire alienating thing.

There is one other thing I would like to say about this business of "no comment" or an official not being able to comment. It's perfectly reasonable for an official to say, "I can't comment because it's going to compromise some person's privacy," or "I can't comment because by law this information is not public," but to say, "I'm not going to comment because it's just going to stir the pot or it's going to get so-and-so in hot water," is something that is less satisfactory to us. I guess that's where "no comment" becomes a red flag, sort of an invitation to probe further.

Scientist need to really consider their abilities to communicate clearly with the media. Can you boil your work down?

Harold Humphrey -- What we are really doing is communicating on two levels. At one level, scientists have to realize that if they are doing something that has public interest, they are going to have to communicate with media people. At the other level, the media people are trying to communicate with the public. We are fooling ourselves if we think we can avoid this communication. It has to happen. I would suggest that the scientists need to really consider their abilities to communicate clearly with the media, who generally are not scientists. In other words, can you boil your work down? We are all very enthusiastic about what we do and we can talk at length in very complicated terminology to colleagues, but the bottom line, if your research is of public interest, is that eventually you are going to have to discuss it in a language that is understandable by non-scientific people. So the communication part is very important.

I think there is a little bit of confidence or rapport that can be established between the press and scientists. It has been my experience on numerous occasions that, given the nature of the work we're doing, it has been understood that I can't give names and addresses of participants in a study. But at times we have asked participants if they would be willing to talk to a press person because the press is often interested in getting a quote from somebody. If the individual is agreeable to that, then we let that individual contact the press person. This makes the media people rather happy, I think, because we're showing some degree of cooperation. In return, in many instances someone who is writing a story will phone me and say, "What do you think about this paragraph I just put together?" and I get a chance to say, "Yes, that's fine," or "No, that's not correct," or "That will be interpreted poorly, let me assist you." We discuss it, and the story ends up coming out fairly acceptable. So, ability to communicate and building some kind of rapport between the media and the scientist can ease us through these needs to communicate to the public.

Bob Campbell -- I think you're right about a lot of reporters feeling very hesitant, perhaps from something ingrained in journalism school, about sharing anything with a source before publication. In my years in the business I've seen that some of the best reporters do this over and over again to make sure that what they are writing is correct. Unfortunately, deadlines sometimes get in the way of doing that all the time.

When information comes out in the press and it's factually wrong, where does the responsibility lie–with the reporter or the scientist?

This business of on the record and off the record is not very simple. Watergate taught us that there is background, and then there is deep background. When we are getting into these situations both the reporter and the scientist have to make clear what they mean. Does off the record mean that the information is for your eyes only; you should not bring it up with anybody else? Does it mean that you shouldn't try to corroborate the information independently? Or just what does it mean? That's something that we all probably ought to keep in mind.

Ellen Rogers -- I've had people tell me, "You can use this information, but don't tell anyone I told you." In that case I usually try to get someone to verify that information and then I can use it.

Frank Quinn -- One of the problems that I've found in the last couple of years with the lake level problems occurs when somebody gets flooded and they are upset. You explain to the media the whys and wherefores and what could be done under various conditions. You also point out that you're with a non-regulatory agency, that you have no control over what's done about water levels, and that it's a political decision. Then the reporter turns around, and the last question on the air is, "But what do you think?" Well what you think is going to be subject to five people and you'll get something from the Secretary of Commerce that says you don't think the right way. We like to point out that we don't make the decisions but we do try to communicate all the ins and outs, and the reporter will still come back with, "Yes, that's very good, but what do you really think? Don't you have compassion for all these poor people out here? A lot of time scientists, particularly government scientists, have a problem dealing with questions as to what their particular view might be rather than questions about the facts of the case.

Martha Walter -- I think this is a good opportunity to see if anyone in the audience has any questions or comments on the issue of correct reporting of materials to the press and not being misinterpreted.

Audience -- I would like to ask Ms. Rogers if you have ever gotten into trouble regarding the accuracy of information provided by people who've asked you not to quote where it came from?

Ellen Rogers -- No, because if I can't verify through someone else, I don't use it, because if I get sued, I can't say who supplied the information.

Audience -- When information comes out in the press and it's factually wrong, where does the responsibility lie? Does it lie with the reporter or the scientist? Obviously it depends on the situation, but how do you deal with the responsibility issue?

Ellen Rogers -- I've had people give me a report and say, "Here's my report, that's all the time I have," and then I'm left to decipher it. I think if the scientist said, "Here's my report, here are the key things that I think are important, and I'll give you fifteen seconds sound

bite on it if I can," it works better. Many times in my reports I'll introduce a complicated aspect and then go on to describe it the best way I can, using the scientist's notes and my notes. I think an extra effort is required when something is complicated. I try to give an extra effort to understand and I would hope the scientist or researcher would also do the same, and say, "Boy you have a puzzled look on your face, and if you have a puzzled look, I bet your viewer or your reader is going to." I think you have to take a little cue from the reporter, and if he or she keeps on asking questions then you have to take time to boil it down.

Bill Turque -- I think that the reporter is responsible for anything that is published under his or her name or goes out over the air with his or her name on it. But before that it is the responsibility of the principal players in the story to point out an error if they see one. Otherwise we sometimes simply don't know. A lot of news organizations are very delinquent about correcting their mistakes, partly because they don't have their feet held to the fire by people who are involved in the story. We will correct mistakes if they're brought to our attention and we're responsible.

Bob Campbell -- If you are a regular reader of *The Free Press*, you will see from time to time that what seems like a quarter of page three is made up of corrections. We try to bend over backwards to correct any errors that are brought to our attention. I would much rather that you let us know if we make a mistake, particularly if you're the one being quoted, so that we can correct it, than to have you sit in your office and stew about what a poor job we're doing.

I would much rather that you let us [the media] know if we make a mistake, so that we can correct it, than to have you sit in your office and stew about what a poor job we're doing.

Frank Blanchard -- It's important to note that errors can be introduced into newspaper stories or broadcast reports by editors, headline writers, and a number of other individuals who handle stories before they appear.

Harold Humphrey -- Let's talk about those headline writers. My experience has been that often the reporter is good and takes the information down and sometimes has time to verify the story. Then this same reporter has had to call me to apologize for what came out in the paper because there is some other guy or gal who wrote the headline. You've got a fairly benign, but factual, story going and a screaming headline that is shouting who knows what, but it's enough to sell papers apparently. A real dilemma in the printed media business is that the headline writers often are not in concert with their reporters, and it is embarrassing to all parties and obviously aggravating to the source of the story or to a public official, because bureaucracies are very sensitive to big black bold letters appearing in print.

Marie Sanderson -- I've got a visual aid--*The Windsor Star*. "Heavy water" [in the headline] connotes to most people something about nuclear reactors or radioactivity, but this really is a story about

metals in precipitation falling on the lakes. So this is a good case in point.

Frank Quinn -- I think we all have our horror stories on that and it points out that more care has to be taken by the headline writers. It's interesting when a story goes out over the AP or one of the other wire services to see what the headlines actually are as it goes around the country. I was interviewed for a story in Toledo about a year ago, and most of the people that picked it up off the wires wrote nice headlines, but one newspaper printed in great big letters, "The Great Lakes to Rise Five Feet." Well, immediately the phone started ringing and people got very concerned. I read the article carefully to make sure I didn't say anything I didn't want to say. It was the same as every other article, but the headline writers must have needed a grabber for that particular page, and some of them are very creative at combining words.

Martha Walter -- Is that a fact of life that we have to live with? I would like to ask the media people if there is any way to educate headline writers.

It's a tremendous challenge to boil down a thousand-word article into five words.

Frank Blanchard -- I don't know about that, but I've written headlines for newspapers before and it's a tremendous challenge to boil down a thousand-word article into five words. It's a tough job to begin with and then the other source of pressure is that you are trying to sell newspapers and you want a catchy headline. I can't suggest an easy solution.

Bob Campbell -- I would concur that if a headline writer is given a story that is anywhere from 15 to 30 inches long, it's darn near impossible to reflect what's in that story in a three-line single-column head where each line can be no more than eight or nine characters. Headlines are written to get people to read the story and sometimes they overstate what's in the story. I'm not sure what can be done about that.

Martha Walter -- That reminds me of the dilemma that Ellen brought up a few minutes ago and that is that the press feels a responsibility to have the public read this material. If it's not presented in a somewhat interesting, attractive way they won't read it. So are we real straight forward and have nobody read it, or do we try to make it especially attractive and at least get people into the story?

Audience -- An incident came to a head about two or three months ago where I work. About every week or so we were being interviewed by different sectors of the media, and we were giving the interviews quite willingly. The stories came out quite well, but all of a sudden in one week we were interviewed by about six people and apparently the reporters started talking to each other. One reporter actually wrote a story who had never even talked to us at the research center or to the people in the community. These people, who the story was about, all of a sudden started reading six stories from six different

papers and seeing it on TV, and they became really concerned. One reporter called to see how the story was being taken and I said, "You really raised a ruckus over here." It had taken me a good year-and-a-half to present this data very carefully so as not to scare people with it, and all of a sudden headline writers had these big things splashed across papers stating that people are eating contaminated meat. I just got so fed up with them that I told a lot of the reporters I was sure that they had gotten more subscriptions thanks to this great story, and to them it was yesterday's story, but at the research center we had to put up with all the incoming calls and the damage to our reputation for doing work for the community itself. I'd just like to know from the media what happens when you do something like that--do you get calls from the people about whom you wrote the story saying that you really did damage to them or their reputation?

Sometimes there is a difference between a story that a public agency doesn't like and a story that is inaccurate.

Bill Turque -- Sometimes there is a difference between a story that a public agency doesn't like and a story that is inaccurate. Those are sometimes two very distinct things. Could you be specific about what the story was or exactly what the facts were?

Audience -- For a year-and-a-half we were doing research to see if wild meat that was eaten by native people was in fact contaminated enough by environmental contaminants that the people should not eat the meat. We found out that it was so-so, but the titles and the headlines and the stories were saying "Poor Indians Must Eat Contaminated Meat Despite Research," whereas it could have been turned the opposite way and it could have said "Meat is Safe to Eat."

Ellen Rogers -- But was it?

Bill Turque -- The study findings were inconclusive?

Audience -- Yes they were. But all the headlines were all very negative and we were getting calls from native people all across Canada and the States who depend a lot on wild meat. And they wanted to know what was going on--they had thought that the risk was pretty moderate based on our research. That really damaged us.

Harold Humphrey -- Was it the conclusion of your scientists that the levels that you were observing in the wild animals were not excessive?

Audience -- That was the conclusion.

Harold Humphrey -- That apparently was not the conclusion of the press. There is your difficulty. The scientists had reached one conclusion and for reasons I don't know the press reached another one.

Ellen Rogers -- I think that this is a perfect example of what happens between a person who has some information and one who is trying to understand what it is. I'm not putting blame on anyone, but I

think its important to say, "This is the conclusion,"--and keep on saying it.

Harold Humphrey -- We scientists work in terms of parts per trillion, micrograms per liter and so on and so forth, and when we say a buzz word like dioxin, immediately you all light up. When we quantify that in some way--say, three parts per trillion, you light up more--you've got a number for goodness sake. I've had experiences where people ran around and said, "I've got three, I've got three," and they are quoted in the papers saying, "I'm contaminated, I'm ruined, I'm going to die, I've got three." Three parts per billion of PCB is a very low amount; your average American has more than that, and yet there was a number, a quantitation, a unit of measurement, and it was played up. That's a difficulty we run into. Again it's that communication. To the scientist there's a perspective about what three parts per trillion, or three parts per billion, means. The media people obviously don't have that perspective. They see numbers and units of measurements, and they have neat catch words like PCBs and dioxins and toxaphene and so forth, and whammo, they have a neat story.

Bill Turque -- I want to comment on something I hear a lot when we have discussions like this, and that is the implication that the reporter somehow has a financial interest in selling more papers or increasing subscriptions as a result of the news that they write. I'm sure the other journalists will agree with me that newspapers are sold by supermarket ads, Dear Abby, and the comic strips, and it doesn't matter what the Michigan Department of Public Health is saying or what the city council is saying or what is on page one. That's a canard that I would really like to do away with. I have never been involved in a story where an editor told me, "Look you really ought to play this one up big because it will help our Sunday circulation." That doesn't happen.

I have never been involved in a story where an editor told me, "Look, you really ought to play this one up big because it will help our Sunday circulation." That doesn't happen.

Martha Walter -- Maybe all the headline writers need to have the same attitude. Perhaps that would solve some of the problems we brought up.

Audience -- One thing I think the media has to realize is that the average person is used to working or living in a yes-and-no society. But as a researcher, if I knew, why would I be researching? If I come up with some data pointing in a certain direction, someone will say, "Is it so or not?" and I say, "I *think* so."

"Is this going to hurt someone?"

"I'm not sure." Well, we have to realize that nothing is definite--everyone thinks we're leaving here today, but we may not. We plan on it, but if I said, "Well probably," someone would lean back and say, "What do you mean?" That's what happens. Nothing's definite, and as soon as you hear us say "probably" or "maybe," you have to realize that just because a researcher is doing something

doesn't make it a fact. A hundred researchers doing it may not make it a fact either. Maybe the news people from different publications should have someone who understands science or who can take some science classes, or go into a research facility and see what data really is; that it's not just one number. One number may be ten thousand data points.

Bob Campbell -- I think we understand that. The question is that we're obligated to tell our readers what research findings mean. There was a presentation here yesterday about how the types of PCBs changed in Saginaw Bay from the inner bay to the outer bay. That is pretty much what the researcher presented, which was fine for that audience. But if I were to do a story on that, I would have to do more than just report that PCBs change from here to there. I would have to say what that means in terms of toxicity, in terms of availability to fish, and all those sorts of things. If we don't know the answer, fine, but we have to say so. So don't feel put on the spot particularly if you have to say, "I don't know," because we say "I don't know," all the time.

Science reporting is most valuable when it can help people make [everyday] decisions.

Bill Turque -- Bob brought up a really important point in talking about areas where scientists and reporters can work together more effectively. I think it would be great if you could somehow help us to make the link between the finding and the everyday life of the reader in some way, such as in some kind of significant decision that they have to make in their life, like "Am I going to eat fish from Lake Superior? Where am I going to live? Am I going to use a certain kind of insulation in my house?" It seems to me that science reporting is most valuable when it can help people make any kind of decision like that. But we must somehow bring down the information to the most common denominator because otherwise the message is not going to come through as clearly as it might.

Martha Walter -- In talking about the need to interpret what scientific findings mean or what three parts per trillion are and about the possible need for reporters to have a better understanding of what they are reporting on, there are two problems that interest me. One is that many reporters are not scientists and, in many cases, reporters have more than just a science beat to cover, so they are really scrambling when they do a science story to get and understand the information as quickly as they can. An issue relating to that is, as I understand it, many times a story is not considered worth covering unless it's immediate, unless it's news breaking today. Some scientific research is not quite that exciting, even though it's interesting and valuable. I think this conference is an example. I talked to a couple of reporters who wanted to come and cover this conference but weren't sure that they could because their editors would probably not let them come unless they could specify something really hot that was going to happen that they should be here for. Yet what a wonderful opportunity this conference is for just sitting and absorbing a lot of information about

Great Lakes research. Does anyone have a response to those issues?

Ellen Rogers -- I think that gets down to deadlines. The reporter wants to know, "What do you have for me today?" and once your story is filed or your report goes on the air you start on tomorrow. We don't have a lot of time to sit through a whole conference and absorb. So we go to the people attending the conference and ask, "What's good today, what have you gotten out of this?" I think deadline pressure creates a lot of problems.

The reporter wants to know, "What do you have for me today?" and once your story is filed you start on tomorrow. We don't have a lot of time to sit through a whole conference.

Martha Walter -- You might need twice the staff to cover science in that way.

Peter Sly -- I think also it is a matter of the kind of material that you are trying to address. There are obviously many issues that we're addressing which are appropriately dealt with on a daily basis in the press. But thinking of the Canadian press, *The Globe and Mail*, for example, has presented a number of extremely well-thought-out and well-prepared articles over the years. I think it's very much to their credit that they have been willing to devote half a page or something like that in an internal section to present a well-prepared, well-argued article that has probably taken several weeks to prepare or perhaps months to prepare if the article is one of a series. It's close to magazine publishing in some ways. I don't know the American press well enough to know how many newspapers in the States accomplish this kind of approach. It's certainly not done widely in Canada, but it is done occasionally and done extremely well, and it provides us with an opportunity to raise topics which are not of immediate interest.

I think there are some very excellent topics which you can consider in this light; for example, the issue of climatic change or climatic variability. There is the whole question of desertification, which is taking place in various parts of the world, and the implications for North America. Now, to none of these things do we have immediate answers, nor can we give you immediate explanations because they are extremely complicated. But they are topics which we have addressed over the past five or ten years and must expand on much more in the future. I can remember my own earliest attempts about 15 years ago to try to get programs off the ground in our own department on climatic studies. It's only now, in the past three or four years, that something like this has come to the fore sufficiently that we can actually start developing major programs. But these programs will probably take decades to provide satisfactory information, and we desperately need the kind of support within the public domain to make them possible. The political realm operates on a maximum of a five-year cycle and more usually somewhere between three and four years. Good research cannot be based on that kind of cyclic operation in most cases.

I think of Ross Horrall's work on the development of techniques and Neal Foster's work presented this morning on olfactory cueing for salmonids and lake trout in the Great Lakes, and the work that was done to develop data on the returns of these fish over a period of many years. You can't expect a return from the adult fish for at least five years. Now unless we are able to sustain projects of this nature we can't hope to address some of the questions in the ecosystem. But they are not topics which are going to provide a sudden return for the press tomorrow and nor are they topics that we can easily explain to you in five minutes. It just doesn't work that way. You've got to be willing to address these bigger program areas if you want us to take a real interest in you. Yes, we have to work short term as well as long term, but you're not giving us fair measure for the most part. You give us the measure that you want to give and not the measure that we need to have. We understand that it's the nature of the business that we're in, but I think a little more give and a little bit more understanding on your part would help us tremendously.

You've got to be willing to address the longer term research areas if you want scientists to take a real interest in you.

Martha Walter -- Are there certain forms of media that are more conducive to the long term in-depth report than others? For example, is a magazine more suited than a daily newspaper or is the print media more suitable than broadcast media?

Frank Quinn -- Let me address that from having seen what has happened with recent high lake levels compared with what went on in '73 and '64. The coverage this time in getting the information out to the public has been extremely good in all media. Throughout the Great Lakes region we've had a number of newspapers that have done anything from an entire segment to two or three pages at a time directed towards the lake level problems, the whys and the wherefores, complete with graphics. We've also had various TV stations take the time to go to several places around the lakes and talk to people, shoot pictures, and produce graphics and develop the story in a series. We've had the same thing in the magazines. I think it can be done on the type of a story that's not a flood, a hurricane, or some other immediate crisis, because it lends itself to a longer term approach and more detail in which the facts can be checked out in just about all aspects of the media.

Marie Sanderson -- I would like to add to what Frank said about the lake levels. I think the reporters on both sides of the border have done an excellent job in presenting this science very clearly and very simply to the ordinary person. Many of you who live in the Great Lakes region are familiar with this. But I think the sad thing is that somehow this information is not convincing to the ordinary person. That's what troubles me. One of my students did a survey just this last term among approximately 75 shore owners on Lake Erie. One hundred percent believed that the high lake levels were not caused by natural causes but by man-made shipping and hydroelectric power companies. So what's the answer there?

I challenge the scientists to get off their high horses, stop pontificating, and realize what kind of writing we're used to. A reporter is not going to have the time to put into a newspaper article that we put into a journal article.

Harold Humphrey -- However, let's throw another monkey wrench into this. I challenge the scientists to get off their high horses, stop pontificating, and realize what kind of writing we're used to. Most people in this room have published peer reviewed articles. How many times do you write that article? Three, four, five, six drafts, and then your peers tear it apart and you rewrite it. That's the kind of writing we're used to. It has to undergo that kind of scrutiny, that kind of time put in it. Obviously, a reporter writing an article in the newspaper is not going to have that kind of time to put into it, so I think we have to realize if we want the lay public world to know about what we're doing we're going to have to accept the fact that it's not going to be the same quality of writing, of thoroughness, of double checking, rechecking, and using the thesaurus that we get when we try to publish in our professional journals.

This is a Catch-22. If nobody knows about the Great Lakes and there is no interest in the Great Lakes, there is no funding for Great Lakes research and we're all out of business. So we do have to go public. It's been shown in the last four to six years that by going public (and your bosses have all done this), that the funding for Great Lakes research in general has been forthcoming. Budgets were just restored, etc. Well when you go public you have to rely on the media to tell the public what you're doing. So on the one hand that type of reporting is not going to be done with the thoroughness we like to enjoy in our professional articles, but on the other hand it is a necessary thing that we have to do. So the fact is that two kinds of communication are really necessary from the scientists' standpoint.

Ellen Rogers -- I think a lot of scientists wait until the reporter comes to them. They want to get their information out to the public, but they wait until the reporter hears it or reads about it somewhere else. I have had numerous doctors call me and say, "I think your viewers would be interested in this surgery. I can get a patient that is willing to talk to you." If you can tell me specifically what you're doing and then show its effect on someone that my viewers can relate to, that's going to grab their attention and get the information across.

Bob Campbell -- Along those same lines I'd suggest that for a conference like this, one of things you might consider next year is to bring together, at the start of the conference, those reporters who are covering it and several of the scientists who have been involved in organizing it and have a pretty good feeling for what is going to be presented. They could outline for us the things that can be easily communicated to the public. We're still going to run around and try to dig up our own stories, but this would help an awful lot at a conference like this where half the time we can't understand what is being presented.

Frank Quinn -- That's an excellent idea. We've never done that before that I'm aware of at the IAGLR conferences, but it was done very effectively this year at the annual meeting of the American Association for the Advancement of Science in Chicago. They brought the press in prior to the actual presentations, some of the people gave an overview on what we were going to say, questions could be asked, and then if the reporters wanted, they attended the presentation. And the press coverage of the meeting, at least of our sections, was excellent.

How do scientists reach reporters? Who do they call at the newspaper or in the university?

Martha Walter -- This raises one of the questions on our list, which is, how do scientists reach reporters? In Ellen's case, some doctors in the area apparently know they can call her. I think there may sometimes be scientists who would like to talk to a reporter but don't know how to break the ice. Who do they call? Who do they call at the newspaper; who do they call in the university?

Frank Blanchard -- I'd like to make a plug for your local public information office. This is what I do, and I try to act as a bridge between reporters and scientists. It is my job to keep up with scientists and their concerns and keep up with reporters and their needs. Public information offices, if well put together, would be a good place to start.

Ellen Rogers -- In my case there's a public relations person at Michigan State University that calls me on different types of news stories that he feels I might be interested in. He alerts me to the stories and then I call the researcher, the doctor, or whoever and go from there. Many times I'll read about something and have no idea it was right in my backyard. When I ask him why he didn't tell me about it, he'll say, "I didn't think you'd be interested."

I have the additional problem of pictures. I'm always asked at the station what pictures do I have for a story. At a conference like this it's difficult to make a TV news story because they want pictures, they want sound, they want something to grab the people's attention. Going with your point, if you can tell me what's the best visual area of the conference, that's probably what we'll hit. If a scientist has video tape or slides or pictures, that makes it more probable that we'll cover the story.

Martha Walter -- Is there ever a situation where a scientist does not have access to a public information office? Are there any government agencies where a scientist would be on his own? Bill, if someone wanted to be covered in *Newsweek*, would they call you up? Is that the first step and how receptive are you to this?

Bill Turque -- It's kind of idiosyncratic for us because we're scattered all over the place. But yes, you can go to whatever regional outlet there is of a national publication. We have editors in New York that specialize in science and medical matters, and they will always be receptive, whether they get something in the mail or a phone call.

Phone calls can be surprisingly effective; rather than throwing something over the transom, just pick up the phone.

Harold Humphrey -- We scientists are kind of humble and reserved--we don't go and do that. In fact one of the most devastating things is to have a discussion with a reporter and you think, "Oh boy, I'm going to be famous," and you're not even in the article.

One of the most devasting things is to have a discussion with a reporter and think you are going to be famous, and you're not even in the article.

Frank Quinn -- We got a complaint about an article in a national publication that dealt with the lake levels where some people in Agency X spent literally hours with several reporters. They eagerly opened the magazine when it came out to see their names in print and their agency mentioned, and there was absolutely nothing. These people were very upset and disgusted with the investment of their time. With a government agency it's always nice to be credited with saying something that people are interested in because you hope that attracts the eye of your congressman or whoever is on the right appropriations committee. But a lot of times people will invest a significant amount of time in working on a story with a reporter and look to see whether or not they are quoted or their agency is even mentioned. Something you have to keep in mind as a reporter is that when a scientist takes several hours with you, that's time they are taking out of their research program, which is what they get their rewards from--publications and position. Most scientists do not get awards, such as an associate professorship, for five interviews per month. So when they invest time and effort in an interview they do like to see some type of acknowledgment.

Peter Sly -- I think, Frank, there is another side to it, and that is that there are many scientists who regard their colleagues as press freaks. In some cases there are certain classes of scientists who seem to spend their time going after the press. That's not usually regarded as a particularly high qualification within the profession itself. I would say that, from the majority of scientists that I've come across, there's a willingness to participate in PR; there's an eagerness to present work in the best possible or most truthful light. There's also a pleasure in seeing the presentation well done and the credits going to all the people who are involved. But there is also a very strong feeling of anti-involvement or anti-participation and even an annoyance, I would say, at some scientists who go out seeking the press. I must say that I tend to follow the latter group. I do not seek the press, but I'm happy to give them information if it seems to me to be something that's useful and worthwhile doing. But in general, my experience with the press, as you have probably gathered, has not been one of excess pleasure and great satisfaction with the results. It's probably partly my own fault--I don't deny that--but I think it's a matter of experience and learning how to cope with the situation. It's something which has evolved over many years, and there are certain parts of the scientific profession which depend very much on the influx of dollars from outside sources or

from sources which can be at least partially influenced by media presentation.

I think it's very inappropriate to have what we sometimes call "Globe and Mail research." It's the latest product of a particular newspaper; in this case *The Globe and Mail*. Sometimes it's very appropriate, but the fact is that very often you get hot and cold responses to whatever turns up in the newspaper or on TV, and that doesn't make for good science either. I think it makes people within the scientific community very annoyed to see funds being either wasted or new directions taken simply because of something which appeared in the paper. So there is another side to it, and I think it's a matter of balance and experience and the way you deal with it.

Marie Sanderson -- May I say to Peter that you belong to a outfit that everyone knows about, Canada Centre for Inland Waters. But we are a new group, and no one had ever heard of us before the toxic blob in the St. Clair River came into the papers. So we were rather glad that we got media coverage for that, and it certainly has helped our research contract.

Bob Campbell -- I would like to address the question of giving credit where credit is due. I often feel bad about that myself, because on larger stories I'll interview maybe 30-35 people, but when you get down to reality you've got 50 or 60 inches to write in, and a lot of the people that you talked to in trying to understand the situation as well as you can said very similar things. You can't quote everyone. You don't have the space to do that and unfortunately we're not set up so we can list the credits at the end of the story. I'd like to. This happened to me recently, and someone at the conference brought it up. Bill Richardson and Russ Kreis spent several hours with me on a story that I did on the Detroit River and Bill was in the version that I wrote. But I understand that the edited version was cut from 70 to 50 inches and Bill was missing. He was very helpful, and he alerted me to a couple other people who ended up being very high in the story. But sometimes there is no way around that.

The test has to be whether the story increased the public's knowledge about an important matter and not whether everybody got a chance to take a bow.

Audience -- I'd like to answer the question just because the *Detroit Free Press* contains the answer. That is that whenever there is any sort of two-bit award given to third place in the lower county AP or whatever, all those people's names get in the paper, no matter how large. In a 50-inch story you could certainly give over two inches to that in 5-point type and list all those people, if you really wanted to. I doubt that you really want to, but if you really felt that it was important you could.

Bob Campbell -- Well, if my editors thought it was important, we could. I can't change it.

Audience -- That's passing the buck.

Bill Turque -- I think the test has to be whether the story was fair, whether it was accurate, whether it increased the public's base of

knowledge about an important matter, and not whether everybody got a chance to take a bow.

Martha Walter -- At Michigan Sea Grant we are involved in this too. We always love to see Sea Grant mentioned in an article about our work, but again, we are looking at different goals. We want to have our name in print because a congressman may notice we're doing this great work and be more inclined to vote funding for us. The reporters are looking at the facts of the story as being the important thing.

Harold Humphrey -- Let me ask a question. I was kind of intrigued by Peter's comment about these scientists who publish in the popular press. For the reporters, when you have a situation that sounds kind of good, do you take a look at it and try to verify it or corroborate the information with other scientists? Do you try to sort out--weed out--these folks who have a tendency to publish first in the popular press and perhaps later get a peer-reviewed article? Do you follow up on your stories?

Bob Campbell -- We try, but sometimes there isn't the opportunity to talk to the people you'd like to before you have go to press. A good example of that was at the World Conference on Large Lakes last year where the researcher from Toronto presented information about contaminants in food. That was probably the best-covered story at that conference, and the next day it was probably the most criticized story to come out of the conference as her peers started tearing holes into the research. We all had deadlines, we all knew that we were interested in the story, and you can't afford to be a day late.

Harold Humphrey -- Had a couple of those catch words in it didn't it.

Bob Campbell -- Sure.

Audience -- What is the role of the press release? How does the press view it and how should scientists view it in terms of its usefulness?

Ellen Rogers -- When we get a lot of press releases from political people, my news director will in some cases say, "That's just a press release," and push it over to one side. Then we get the press release that is alerting us to a story that we wouldn't know about otherwise. In most cases, I read the press releases I open, I file them, and on the day the event occurs we look at the press release for key information on where, when, and who we should talk to. I don't think you can go wrong with a press release because that alerts us to your story.

I don't think you can go wrong with a press release because that alerts us to your story.

Harold Humphrey -- But you better make sure the press release gets out to everybody. I've had guys call up--I think that fellow at the end of the table barked at me one day and asked how come he didn't get a press release. I said, "I don't know, you'll have the ask the press office. I didn't have anything to do with it." There are hazards to

using press releases because sometimes they're missed or they don't get to everybody.

Frank Quinn -- Press releases are one of the things we do use through our office in Boulder that does our PR work They do like to get out so many stories, and if they see something that they feel would be of interest they try to flag it. Our office here is involved in only two or three a year at most, but we've had a lot of success with them judging by the clipping service. We did one about three or four months ago on the lake levels and the response was amazing. We got clippings from Tulsa, Dallas, Los Angeles, the *New York Times*. There are people who will pick up things from a press release who you might not think would be the least bit interested, so you do get extremely broad coverage. We found it to be very effective.

Bill Turque -- I think press releases are important but they should be followed up with a phone call if you really want to make sure that it's getting to the right place, that the right person is reading it. You have to make an additional pitch because we get so many releases, and things do fall behind desks and through cracks.

The animal activist people were most concerned because they thought that there were mice swimming around in the sewer system and probably drowning.

Audience -- As a journalist I have often found scientists dealing with me in the language that they would use in dealing with their peers. I was told one time by a woman that a friend of hers had monozygotic daughters and I didn't know whether to gasp or what. My initial thought was to say, "Oh, how awful," until high school biology came into play and I thought, "Oh, identical twins, I believe we're talking about here." And don't think the press is not concerned either. One of the recent issues of *Editor and Publisher* talked about a situation in the East where an article had described the sewage system in a particular community as being contaminated with mice and shrimp. Of course the animal activist people were most concerned because they thought that there were mice swimming around in the sewer system and probably drowning. Now in that case, had the source made clear that they were talking about mysid shrimp, and perhaps spelled it for the reporter and given just a very short explanation of what mysid shrimp are, there would have been no misunderstanding of what was going on.

I think that we as journalists have to ask you questions; that you as scientists have to, as Ellen Rogers pointed out, pick up on the cues--does somebody look confused. Now it won't happen with any of the panelists we have here, but you can get a reporter who might be awed by the aura of interviewing somebody with an excellent reputation within the scientific community. Without the experience or the scientific background, the reporter may be a little bit timid about asking questions and coming across as if they haven't done their homework. They don't want to appear too stupid in front of you. But as Ellen said they have to be able to explain the research to their readers and viewers. So perhaps you could couch what you're saying in a little bit different terminology than you would use

A journalist without a scientific background may need some help from the scientist to get that clear, concise story that is, in essence, literature in a hurry.

in a conference like this. I think it was Mr. Humphrey who talked about being able to summarize your research--can you in 90 seconds or three paragraphs or less take what is one, two, or three years of research and summarize it into five key points? Perhaps draw analogies to what a reader or viewer is going to understand.

I think this is something that scientists have to consider; that their peers can understand them, but a journalist without the scientific background may need some help from you folks to get that clear, concise story that is, in essence, literature in a hurry, that has to fit into 11 or 12 inches. That is not long for complex subjects.

Audience -- I wonder if either the scientists or the media see a place for professional development conferences or courses for the media in science writing and for scientists in communications? A few months ago I was, I guess I would have to say appalled, when I was asked to speak to a seminar for graduate, almost doctoral level, students in a scientific discipline who had had no exposure as to how to communicate their science to the public. I had to think back to high school speech class to come up with things that seemed relevant to helping them do this.

Peter Sly -- I think this is a first rate suggestion. It is one that has been made by a number of senior press people, not so much on the Canadian side to my knowledge, but certainly on the U.S. side. On a public radio broadcast a couple of weeks ago, exactly this point was being made by some very senior people. I think it would be of immense value, particularly if we could get the few really good people who are publishing in significant newspapers and journals on both sides of the border tuned in with some of the scientific fraternity and the way we work and what we do. Perhaps this could be done on a sabbatical basis or on an interchange basis. The mechanisms are in place in most cases; they just haven't been used. I think that many of us would be very appreciative and laud such an activity.

Harold Humphrey -- The scientist is spit out of his Ph.D. or M.D. or whatever school much like a parent-to-be is spit out into society. They don't have the training on how to parent; scientists don't have the training on how to deal with the media. Yet many of us end up in jobs that attract media attention, so we have to acquire that skill. Perhaps it would be good to have training in media communications--either that or scientists have to be Leo's and like to have the stage.

Martha Walter -- Time for one more comment.

Audience -- I think that's an excellent idea. I'm one of those reporters who would love to come and spend some time at your conference. I'm intrigued by the politics that are going on. The letter that I got with the agenda had wonderful ideas and good story possibilities, and I wondered what could I find in the agenda to convince my editor to let me neglect my duties for half a day or a day. Frankly,

The only thing I could understand in the agenda for this meeting was "coffee break."

the only thing I could understand on the daily agendas was the coffee breaks, so I'm here for this panel discussion and this is all the time I can spend. I'll have to get back to people on the agenda items and their reports later.

Martha Walter -- So the agendas need to be simplified as well as the interviews.

Audience -- Several years ago at the American Geophysical Union, which is one of the national science meetings, all the session moderators were asked well in advance to write an abstract of what was being presented in their session. That idea might be pursued. It's sort of a summary but it gives the topical areas, the highlights.

Martha Walter -- It would be a good precursor to the preconference press conference.

Audience -- It would help the media because just the title of a talk may not make any sense but the abstract might.

Audience -- At a AAAS annual meeting they ran workshop sessions for scientists on learning to communicate ideas and get them across to the media, so some of these kinds of workshops are there.

Martha Walter -- It's 5:00 and we're going to have to break. I think a round of applause for our panel is in order.

BIOGRAPHICAL SKETCHES

Frank Blanchard - Mr. Blanchard is a senior science writer with The University of Michigan News and Information Services. He oversees coverage of U-M research in biology, engineering, botany, astronomy, physics, public health, pharmacy, and dentistry. In 1987, his department at U-M won the top prize in a national competition for excellence in general newswriting. Mr. Blanchard previously was a reporter and editor for the Associated Press, Atlanta Bureau. While there, he covered the U.S. Centers for Disease Control. He has also been a reporter for three newspapers and United Press International. Mr. Blanchard holds a B.S. degree in Journalism from the University of Florida.

Robert Campbell - Mr. Campbell is the environment writer for the *Detroit Free Press*, where he earlier covered the federal courts, politics, and Macomb County government. Mr. Campbell has won several awards from wire services and the Michigan Press Association for feature, investigative, and breaking news reporting. In 1987 he was a national finalist in the prestigious Penney-Missouri contest for consumer writing for a *Detroit Magazine* article about the risks of eating Great Lakes fish. He has been a panelist and has given talks on effective public information transfer at employee training programs conducted by the U.S. Environmental Protection Agency and the Michigan Department of Natural Resources. Mr. Campbell holds a B.A. in Journalism from Michigan State University, where he was managing editor of *The State News*, the MSU student newspaper.

Ellen Rogers - Currently employed by the Ford Motor Company World Headquarters Communications Network, Employee Communications Department, Ms. Rogers has been a news reporter for four Midwest television stations, including WILX-TV in Lansing, Michigan. While at WILX, she was responsible for biweekly reports on medical, health, and surgery issues. In addition to science reporting, she has broad experience in general news, crime, and political reporting, and has written, edited, produced, and anchored news programs. Ms. Rogers has also contributed to local program network and Cable News Network broadcasts. Ms. Rogers holds a B.S. degree in Mass Communication from St. Cloud University in St. Cloud, Minnesota.

Bill Turque - Mr. Turque joined *Newsweek* magazine in 1986, where he now handles general news reporting from *Newsweek's* Detroit Bureau. In 1987, he co-authored "The Greater Lakes," an article that examined the high water level and toxic contamination problems of the Great Lakes. He has been a reporter for the *Kansas City Star* and national correspondent for the *Dallas Times Herald.* His work there included assignments in Latin America to cover the cocaine trade and in Japan to interview survivors of the 1945 atomic bombing of Hiroshima. Mr. Turque earned a B.A. in English from The University of Michigan, where he was co-editor-in-chief of the *Michigan Daily*, the U-M student newspaper.

Harold E. B. Humphrey - Dr. Humphrey is Science Liaison Coordinator and Environmental Epidemiologist with the Michigan Department of Public Health's Center for Environmental Health Sciences. He is responsible for major investigations that evaluate human exposure to environmental contaminants. He works closely with news media and the lay public to interpret highly technical and sometimes controversial information about toxic environmental contamination. He also serves on the Michigan Environmental Review Board, the International Joint Commission Science Advisory Board, the Michigan Sea Grant College Program External Advisory Committee, and he is an adjunct professor with the College of Human Medicine at Michigan State University.

Frank Quinn - Dr. Quinn is head of the Lake Hydrology Section of the National Oceanic and Atmospheric Administration's Great Lakes Environmental Research Laboratory in Ann Arbor, Michigan. He is recognized by both scientists and news media for his knowledge of Great Lakes hydrology. During the recent period of extraordinarily high Great Lakes water levels, Dr. Quinn's expertise was referred to frequently by news media and others. As a result, he has been widely quoted in regional and national publications, including the July 1987 *National Geographic Magazine*, and has been called upon often to speak at many public and professional forums.

Marie Sanderson - Dr. Sanderson is Professor of Geography and the founding director of the Great Lakes Institute (GLI), both at the Universtiy of Windsor, Windsor, Ontario. She is an internationally known scientist who has worked in the People's Republic of China, the U.S.S.R., India, Japan, England, and the U.S. She is active in many scientific and professional organizations. As head of GLI, Dr. Sanderson oversees research on high-profile, controversial environmental problems such as toxic contamination in Great Lakes connecting channels and Great Lakes water levels and diversions. Consequently, she has had frequent contact with radio, television, and newspaper reporters. Dr. Sanderson has also organized a course outside the university for Detroit/Windsor-area citizens about the Great Lakes.

Peter G. Sly - Dr. Sly is a senior scientist with the Canada Centre for Inland Waters (CCIW) in Burlington, Ontario. Since coming to CCIW from his native United Kingdom in 1967, Dr. Sly has used his extensive research and management experience to coordinate collaborative research projects that address a wide range of environmental problems. During the 1970s, he developed many of CCIW's major Great Lakes research programs. Dr. Sly, a geologist and engineer, is currently involved with fish habitat studies in the Great Lakes and holds a number of scientific editorial positions. He has written over 100 scientific reports and publications, is a past president of the International Association for Great Lakes Research, and is a member of several other professional societies.

Martha Walter - Ms. Walter is Communications Co-Manager for the Michigan Sea Grant College Program in Ann Arbor. She has been with Michigan Sea Grant for five years, where her duties have included media relations and the development of strategies for relaying Sea Grant research results to the public. She and her staff have won national recognition for excellence in newsletter writing and design. Previously, Ms. Walter held a variety of editing and writing positions with the Great Lakes Basin Commission in Ann Arbor. Much of her work for the Commission involved editing technical information and writing about such information for a lay audience. She has also done free-lance editing and writing. Ms. Walter has a B.S. degree in Resource Development from Michigan State University.

BIBLIOGRAPHY

This annotated bibliography is adapted from an extensive bibliography graciously provided by Sharon Dunwoody, Associate Professor of Journalism and Mass Communication, School of Journalism and Mass Communication, University of Wisconsin, Madison. Professor Dunwoody is a former newspaper science reporter. One of her research interests is the examination of the processes by which scientific information is selected and used by mass media.

This bibliography offers citations from the research literature in the United States on mass media coverage of science and technology. Most of the entries are from the 1970s to 1987.

Audiences for Mass Media Science Communication

Cronholm, Margareta, and Sandell, Rolf. **Scientific Information: A Review of Research**. *Journal of Communication* 31:85-96, Spring 1981.

Summarizes existing science communication research; most of the citations are of American research endeavors. The goal is to examine factors that "contribute to the effects of science communication."

Krieghbaum, Hillier. **Science and the Mass Media**. New York: University Press, 1967.

Examines the publics for mass media science information. Results of a large-scale landmark study of public attention to the Russian launching of Sputnik in the 1950s are detailed.

Mazur, Allan. **The Dynamics of Technical Controversy**. Washington, D.C.: Communications Press, Inc., 1981.

Examines the rise and fall of several scientific and technological controversies and traces the relationship between public attitudes toward issues and media coverage of those issues.

Nunn, Clyde Z. **Readership and Coverage of Science and Technology in Newspapers**. *Journalism Quarterly* 56:27-30, Spring 1979.

This secondary analysis of surveys by the Newspaper Advertising Bureau suggests editors underestimate public interest in science news.

Wade, Serena, and Schramm, Wilbur. **The Mass Media as Sources of Public Affairs, Science, and Health Knowledge**. *Public Opinion Quarterly* 33:197-209, Summer 1969.

This analysis of data from four national surveys found that while television was the chief source of public affairs information, newspapers and magazines were preferred for science and health information. Print users, on the average, had more specific information about science and health than did persons who chiefly used the broadcast media. The authors argue that the relationship between level of education and mass media used explains much of what they found.

Nature of Mass Media Science Communication

Bowman, J.S., and Hanaford, K. **Mass Media and the Environment Since Earth Day**. *Journalism Quarterly* 54:160-165, Spring 1977.

The authors sought environmental stories published in eight U.S. mass circulation magazines during 1971 to 1975. They analyzed the frequency of stories and the topics dealt with, concluding that readers of "most of the leading mass circulation magazines" are unlikely to get an adequate exposure to environmental problems. The most popular environmental topics in these magazines were management of resources and water quality, while air quality and environmental additives were least popular.

Burger, Edward J. Jr. **Health Risks: The Challenge of Informing the Public**. Washington, D.C.: The Media Institute, 1984.

Through a series of case studies, the author argues that the media have done a less-than-adequate and sometimes destructive job of conveying risk information. Among the press's faults, he notes, are tendencies to sensationalize and to oversimplify.

Cole, Bruce J. **Trends in Science and Conflict Coverage in Four Metropolitan Newspapers**. *Journalism Quarterly* 52:465-471, Autumn, 1975.

A content analysis of four newspapers at three times--1951, 1961, and 1971--indicated that more controversy was reported in 1971 science articles than in the previous years, and the controversies were

reported across a much broader range of subject matter in 1971. The study also indicated that science writers may be less likely to report controversy in science than are general staff reporters.

Culbertson, Hugh M., and Stempel III, Guido H. **Possible Barriers to Agenda Setting in Medical News**. *Newspaper Research Journal* 5:53-60, Spring 1984.

The authors content analyzed more than 2000 medical news articles, editorials and columns from 10 Ohio daily newspapers and surveyed more than 400 Ohio residents about their health care beliefs. They found no relationship between topics considered important by readers and those given prominent play in newspapers.

Friemuth, Vicki S.; Greenberg, Rachel H.; DeWitt, Jean; and Romano, Rose Mary. **Covering Cancer: Newspapers and the Public Interest**. *Journal of Communication* 34:62-73, Winter 1984.

The authors compared coverage of cancer in 50 daily newspapers from 1977 and 1980. While they found that coverage of risk factors had increased dramatically between 1977 and 1980, they also found that the more recent stories continued to focus on "fast-breaking" events, giving the coverage a fragmented appearance.

Gerbner, George; Gross, Larry; Morgan, Michael; and Signorielli, Nancy. **Scientists on the TV Screen**. *Society* 18:41-44, May/June 1981; and Gerbner, George; Gross, Larry; Morgan, Michael; and Signorielli, Nancy. **Health and Medicine on Television**. *The New England Journal of Medicine* 305:901-904, October 8, 1981.

Since the late 1960s, Gerbner and his colleagues have been trying to determine "the conceptions of social reality that television tends to foster in different groups of viewers." Their massive content analyses of prime-time TV have included measures of images of scientists and of science, and in these articles the investigators offer some preliminary data supporting their contention that "science is bad news but good drama" on TV.

Glynn, Carroll J., and Tims, Albert R. **Sensationalism in Science Issues: A Case Study**. *Journalism Quarterly* 59:126-131, Spring 1982.

Examines the manner in which two newspapers handled the Tellico Dam controversy. Concludes that, although the newspapers did not sensationalize the issues, they often concentrated on peripheral issues (such as the snail darter), sometimes to the detriment of larger issues such as the potential impact of the dam.

Greenberg, Rachel H.; Freimuth, Vicki S.; and Bratick, Elaine. **A Content Analytic Study of Daily Newspaper Coverage of Cancer**. In Nimmo, Dan, ed. *Communication Yearbook 3* (New Brunswick, NJ: Transaction Books, 1979) pp. 645-654.

More than 2000 newspaper stories from 49 daily newspapers were examined in this analysis of stories about cancer. The researchers found that the stories spent little space discussing prevention or detection, two high priority topics among cancer specialists and health communicators. Also lacking was information about such contextual factors as incidence rates and risk factors.

The Media Institute. **Television Evening News Covers Nuclear Energy**. Washington, D.C.: The Media Institute, 1979.

The institute, a nonprofit organization that receives funding from major corporations, conducted a content analysis of 469 television network newscasts about nuclear energy that were aired within the 10-year period of August 5, 1968, to April 20, 1979. This time period includes the Three Mile Island accident. Analysis indicated that network broadcasts did not provide sufficient information to enable a viewer to "make a rational assessment of the risks and benefits of nuclear power generation"; indeed, the institute concluded that the network programming contained a general, anti-nuclear bias.

Nimmo, Dan and Combs, James E. **Nightly Horrors**. Knoxville: The University of Tennessee Press, 1985.

The authors explore network television coverage of crises by examining the narratives chosen by the networks to tell stories. Among the stories explored are the accident at Three Mile Island, the eruption of Mount St. Helens, and the 1982 Tylenol poisonings. For each case, the authors analyzed network telecasts from the date of the initial breaking of the story through the time when it no longer received continuous coverage.

Schoenfeld, A. Clay. **The Press and NEPA: The Case of the Missing Agenda**. *Journalism Quarterly* 56:577-585, Autumn 1979.

Some mass communications researchers argue the media have an agenda-setting effect; by publicizing a topic they make it more salient to the public. In this article, Schoenfeld looks for an agenda-setting effect related to the passage of the National Environmental Policy Act in 1969. He finds none. Media coverage

of the evolution of the legislation was sparse; the author argues that media thus played only a minor role in making the landmark piece of legislation salient to the public before it became law.

Schoenfeld, A. Clay; Meier, Robert F.; and Griffin, Robert J. **Constructing a Social Problem: The Press and the Environment**. *Social Problems* 27:38-61, October 1979.

The authors examine the role of the press in the early construction and delineation of environmental problems as a new social reality. They found that newspapers in the 1960s did not contribute much to the dialogue surrounding emerging environmental issues. The authors then try to make sense of the lack of coverage through sociological explanations of news making.

Science in the Streets. Report of the Twentieth Century Fund Task Force on the Communication of Scientific Risk. New York: Priority Press, 1984.

Dominating this task force report is a background paper by sociologist Dorothy Nelkin, who discusses several case studies of media coverage of scientific risk.

Stephens, Mitchell, and Edison, Nadyne G. **News Media Coverage of Issues During the Accident at Three-Mile Island**. *Journalism Quarterly* 59:199-204, 259, Summer 1982.

This article offers details of the content analysis that dominated the review of media coverage of TMI done in 1979 by a presidential task force. The analysis found relative balance in the media coverage and concluded that, rather than offering an alarming or negative picture of the accident, media coverage "was predominantly reassuring or positive."

Strodthoff, Glenn G., Hawkins, Robert P., and Schoenfeld, A. Clay, **Media Roles in a Social Movement: A Model of Ideology Diffusion**. *Journal of Communication* 35:134-153, Spring 1985.

This study of environmental coverage in selected environmental and general interest magazines from 1959 to 1979 showed a diffusion of such information from the specialized press to the general media, suggesting that the special interest magazines preceded the general publications in their legitimation of an environmental ideology.

Accuracy of Mass Media Science Communication

Borman, Susan Cray. **Communication Accuracy in Magazine Science Reporting**. *Journalism Quarterly* 55:345-346, Summer 1978.

This evaluation of the accuracy of mass circulation magazine articles that dealt with three major scientific events found the accuracy level as a whole to be good. The major criticism was omission of relevant information, and the most frequently cited omission was the failure to mention the names of the primary investigators.

Broberg, Katie. **Scientists' Stopping Behavior as Indicator of Writer's Skill**. *Journalism Quarterly* 50:763-767, Winter 1973.

This analysis of corrections made by scientists to press releases prepared about their research found that of all changes made, additions accounted for the highest number. As the material in a press release became more complex, the scientist tended to add more detail. The analysis also found that scientists changed more technical terms to lay terms than the reverse. The author concludes that none of the writers of the press releases being studied could "satisfy the scientists' penchant for explaining their research in greater detail."

Dunwoody, Sharon. **A Question of Accuracy**. *IEEE Transactions on Professional Communication* PC-25:196-199, December 1982.

This article reviews the research literature on accuracy of mass media science coverage and suggests that when scientists claim something is inaccurate, they are in most cases saying a piece is incomplete and lacks details. This suggests that scientists may be using inappropriate criteria to evaluate the accuracy of journalistic accounts.

Fahnestock, Jeanne. **Accommodating Science: The Rhetorical Life of Scientific Facts**. *Written Communication* 3:275-296, July 1986.

The author paired articles that were published in **Science** magazine with popularized versions published in **Science 8***, using rhetorical theory to examine the changes that occurred as information passed "from one rhetorical situation to another." She finds, for example, that the popularized versions use words that emphasize the uniqueness of the information, that exaggerate the original scientific assertions, and that downplay the subtle qualifications that dominate scientific prose.

Moore, Barbara, and Singletary, Michael. **Scientific Sources' Perceptions of Network News Accuracy**. *Journalism Quarterly* 62:816-823, Winter 1985.

The authors sent transcripts of network science stories to sources, asking the scientists to provide feedback on errors. Almost half of the respondents found the stories to be completely accurate, while another third regarded the stories as "generally accurate." The most common complaint was that air time given the story was not adequate; second on the complaint list was that essential details had been omitted.

Tankard, James W., and Ryan, Michael. **News Source Perceptions of Accuracy of Science Coverage**. *Journalism Quarterly* 51:219-225, 334, Summer 1974.

The researchers asked sources to rate the accuracy of stories about themselves and their work. Scientists were strongly critical of the accuracy of science news reporting in general and found a mean number of 6.22 errors in their own stories. Most of the errors were those of omission rather than misstatements of fact.

Tichenor, Phillip J.; Olien, Clarice N.; Harrison, Annette; and Donohue, George. **Mass Communication Systems and Communication Accuracy in Science News Reporting**. *Journalism Quarterly* 47:673-683, Winter 1970.

The researchers asked individuals to read science stories and then to recall the main content of the stories. The scientists quoted in the articles were then asked to judge the accuracy of the audience recall of the stories. Nearly two-thirds of the audience recall of the average article was judged acceptably accurate by the scientist quoted.

Readability of Mass Media Science Communication

Bostian, Lloyd R. **How Active, Passive and Nominal Styles Affect Readability of Science Writing**. *Journalism Quarterly* 60:635-640, 670, Winter 1983.

In a quasi-experimental setting, the author found that readers considered science stories written in active voice to be more interesting and easier to read than the same stories written in passive voice and in nominal style (substituting nouns for verbs). However, recall of the information didn't vary across the three types of writing.

Bostian, Lloyd R., and Bryne, Tomas E. **Comprehension of Styles of Science Writing.** *Journalism Quarterly* 61:676-678, Autumn 1984.

Using the Cloze readability measure, the authors found that technical articles written in predominantly active voice were easier to comprehend than were pieces written in predominantly passive or nominal styles.

Funkhouser, G. Ray, and Maccoby, Nathan. **Communicating Specialized Science Information to a Lay Audience**. *Journal of Communication* 21:58-71, March 1971; and **Tailoring Science Writing to the General Audience**. *Journalism Quarterly* 50:220-226, Summer 1973.

Both articles are based on a study of the relationship of textual variables in science articles to audience information gain, enjoyment, attitude change and the tendency to seek further information about the topic in the story. One finding was that scientists in the study enjoyed the "simplified" version of the science articles as much as did the nonscientists.

Grunig, James E. **Three Stopping Experiments on the Communication of Science**. *Journalism Quarterly* 51:387-399, Autumn 1974.

Grunig tested the ability of such readability devices as parables and analogies in economics stories to cause readers to stop and think about the material. He found that the style of the stories was less important than whether the content was relevant to the reader. For readers who found the content relevant, parables and analogies stimulated thinking and possible understanding. Examples, on the other hand, seemed to stimulate even less thinking than did a straightforward treatment of the story content.

Hunsaker, A. **Enjoyment and Information Gain in Science Articles**. *Journalism Quarterly* 56:617-619, Autumn 1979.

In an experimental setting, the author compared reader enjoyment and information gain among subjects who read one of three versions of a psychology journal article. The three varied only in language simplicity. Findings indicated that while reader enjoyment increased as the writing became simpler, information gain remained the same. He concluded that science can be written in a form that lay people would enjoy without sacrificing the amount of information being ingested.

Scientists, Journalists, and Their Interactions

Carter, Roy E. **Newspaper 'Gatekeepers' and the Sources of News**. *Public Opinion Quarterly* 22:133-144, 1958.

This study offers a number of factors that influence relationships between journalists and physicians as sources.

Dennis, Everette E., and McCartney, James. **Science Journalists on Metropolitan Dailies**. *The Journal of Environmental Education* 10:9-15, Spring 1979.

This survey of 75 reporters from 52 different media organizations examines journalists' perceptions of their working conditions, including notions of their audiences and the reporters' relationships with their sources. The researchers found "many" of their respondents to have special credentials and training in science.

Dunwoody, Sharon. **Science Writers at Work**. Research Report No. 7. Bloomington, Ind.: School of Journalism Center for New Communications, 1978.

The study examines the news-selection behaviors of some of the top mass media science writers in the United States as they covered a large scientific meeting. Findings emphasize the high degree of cooperation among journalists as well as their dependence on the meeting planners to determine what was news about the meeting itself.

Dunwoody, Sharon. **The Science Writing Inner Club: A Communication Link Between Science and the Lay Public**. *Science, Technology, & Human Values* 5:14-22, Winter 1980.

This article argues that a relatively small group of prestigious science journalists plays a substantial role in determining what news the public sees in the media about science. The "club" is examined as an informal group that, among other functions, serves as a pool of resources for its participants.

Dunwoody, Sharon, and Scott, Byron. **Scientists as Mass Media Sources**. *Journalism Quarterly* 59:52-59, Spring 1982.

Scientists in this two-university survey were found to have much more contact with journalists than was expected. This study also found that a scientist's rank was positively related to both frequency of contact with journalists and evaluation of the quality of mass media coverage of science. But it found no relationship between a scientist's productivity and his/her level of exposure in the mass media.

Dunwoody, Sharon, and Ryan, Michael. **Public Information Persons as Mediators Between Scientists and Science Writers**. *Journalism Quarterly* 60:647-656, Winter 1983.

This study of scientists' perceptions of the roles played by public information personnel found that, although scientists generally viewed such personnel favorably, they did not view them as integral to the dissemination of science.

Dunwoody, Sharon, and Ryan, Michael. **Scientific Barriers to the Popularization of Science in the Mass Media**. *Journal of Communication* 35:26-42, Winter 1985.

Scientists who responded to this national survey agreed that science as a culture does not reward scientists for becoming involved in efforts to increase the public understanding of science.

Glynn, Carroll J. **Science Reporters and Their Editors Judge "Sensationalism"**. *Newspaper Research Journal* 6:69-74, Spring 1985.

This survey of newspaper science reporters and their editors indicated that, while both journalists and editors viewed "sensationalism" negatively, editors were less negative than reporters about the concept. And the longer an individual had spent in a particular news organization, the more positively that individual rated the sensational treatment of science articles. This finding suggests that, over time, journalists are socialized into the values of their particular newsroom.

Goodell, Rae. **The Visible Scientists**. Boston: Little, Brown and Company, 1977.

The author has interviewed articulate science celebrities and discusses not only their pervasiveness in mass media science communication but also how and why they got there. The book examines science journalists to a limited degree.

Johnson, Kenneth. **Dimensions of Judgment of Science News Stories**. *Journalism Quarterly* 40:315-322, Summer 1963.

In this experimental setting, a group of editors evaluated the newsworthiness of science news stories primarily on the basis of color and excitement, while groups of science writers, scientists, and both readers and nonreaders of science news all emphasized accuracy and significance.

Nelkin, Dorothy. **Selling Science: How the Press Covers Science and Technology**. New York: W.H. Freeman and Co., 1987.

This 224-page book provides an excellent critical overview of science communication by the mass media. Examines the historic and modern-day relationships between scientists and reporters, including how institutions and scientists often successfully control the media. The author suggests why media coverage of science is flawed, explains how scientists are prime generators of news, and discusses how journalists may be too uncritical of the scientific world.

Pfund, Nancy, and Hofstadter, Laura. **Biomedical Innovation and the Press**. *Journal of Communication* 31:138-154, Spring 1981.

The authors examined media coverage of industry involvement in recombinant DNA research in an attempt to describe the level of complexity with which the media approached the issues. Among other things, they found journalists relying on "mainstream" scientists as sources, with little attention paid to dissident scientists or other individuals who did not offer consensual views. They also found coverage of continuing issues to be disjointed, with many articles failing to provide scientific contexts for reported discoveries.

Ryan, Michael. **Attitudes of Scientists and Journalists Toward Media Coverage of Science News**. *Journalism Quarterly* 56:18-26, 53, Spring 1979.

On the basis of a survey of scientists and science reporters, Ryan concludes that the attitudes of scientists and journalists toward science news coverage are "remarkably similar." But each group perceived a larger attitudinal gap than actually existed.

Ryan, Michael, and Dunwoody, Sharon. **Academic and Professional Training Patterns of Science Writers**. *Journalism Quarterly* 52:239-246, 290, Summer 1975.

This study is the most recent one on a national scale to look at the educational backgrounds of science reporters. The study also asked respondents to recommend training for future science reporters.

Shepherd, R. Gordon. **Science News of Controversy: The Case of Marijuana**. *Journalism Monographs*. No. 62, August 1979; Shepherd, R. Gordon. **Selectivity of Sources Reporting the Marijuana Controversy**. *Journal of Communication* 31:129-137, Spring 1981.

This study investigated how well the press functioned in popularizing scientific views and findings on a controversial issue. Shepherd's main interest was in the credentials of "experts" used by journalists for issues such as marijuana. Among other findings, he concluded that the actual marijuana expertise of authorities quoted by the press was quite low; the majority of "experts" had themselves done little or no reserach on marijuana.

Media Coverage of the Social Sciences

Dunwoody, Sharon, and Stocking, S. Holly. **Social Scientists and Journalists: Confronting the Stereotypes**. In Eli Rubinstein and Jane Brown, eds. *The Media, Social Science, and Social Policy for Children*. Norwood, NJ: Ablex Publishing Company, 1985, pp. 167-187.

The authors suggest that relationships between social scientists and journalists are sometimes based more on stereotypical images of one another than on reality. They explore some of the more common stereotypical portrayals of journalists utilized by scientists.

Higbie, Charles E., and Hammond, Phillip E. **A Mildly Sociological View of the Press Coverage of a Sociological Convention**. *The American Sociologist* 1:145-147, May 1966; and Hammond, Phillip E., and Higbie, Charles E. **The Convention**. *The American Sociologist* 3:51-53, February 1968.

The authors and some of their graduate students observed journalists and sociologists interacting at the 1965 American Sociological Association meeting in Chicago. The first article publishes their findings, along with recommendations for making the meeting more accessible to journalists who know little about sociology. The second article recounts the authors' own attempts to make the 1966 meeting more accessible.

McCall, Robert B., and Stocking, S. Holly. **Between Scientists and Public: Communicating Psychological Research Through the Mass Media**. *American Psychologist* 37:985-995, September 1982.

Describes some of the differences between how social scientists and journalists operate and provides practical hints on how scientists can work more productively with journalists.

Walum, Laurel Richardson. **Sociology and the Mass Media: Some Major Problems and Modest Proposals**. *The American Sociologist* 10:28-32, February 1975.

A research presentation by Walum at a meeting of the American Sociological Association generated a flurry of media attention. The author describes what happened to her and her research, ultimately arguing that social scientists must take a more active role in the dissemination process.

Weigel, Russell H., and Pappas, Jeffrey J. **Social Science and the Press**. *American Psychologist* 36:480-487, May 1981.

The authors analyze media coverage of some of the initial findings by sociologist James Coleman on the effects of school desegregation. They found that the media uncritically disseminated the research, even in the face of dissenting voices from within the sociological community.

Teaching Mass Media Science Reporting

Burkett, Warren. **News Reporting: Science, Medicine, and High Technology**. Ames, Iowa: The Iowa State University Press, 1986.

This science writing text provides a basic look at the history of science writing in the United States, how science news is gathered by the mass media, and what journalists should look for when covering such topics as drugs and technological risk.

Friedman, Sharon M., and Trimble, Walter. **Science Writing Workshop**. Bethlehem, Penn.: Lehigh University, 1981.

This report summarizes a three-and-a-half-day workshop for general assignment reporters on dealing with science-related topics. The report offers details on teaching strategies as well as analysis of a follow-up study of the potential effects of the workshop on reporters' working habits.

Gastel, Barbara. **Presenting Science to the Public**. Philadelphia, Penn.: ISI Press, 1983.

Practical advice to the scientist who serves as a source of information to journalists or who may wish to communicate directly to the public.

Griffin, Robert J., and Schoenfeld, Clay. **Environmental Impact: University Programs in Journalism**. *The Journal of Environmental Education* 14:4-10, Fall 1982.

A survey of the environmental content of journalism courses throughout the country found that about 10 percent of the programs have separate courses in environmental reporting, while environmental content otherwise tends to surface in public affairs reporting courses. The best predictors of environmental writing content in programs were the presence of an environmentally interested faculty member and of a graduate-level environmental program.

Teaching Science and Environmental Writing. *The Journal of Environmental Education*. Vol. 10, Spring 1979.

This special issue of the journal published papers presented in 1978 at a science writing symposium in Seattle. Included are a survey of science journalists on metropolitan daily newspapers, a discussion of the structures and goals of science and environmental writing courses being taught at colleges and universities, and a number of articles on specific teaching techniques.

Teaching Scientific Writing. *The English Journal*. Vol. 67, Spring 1978.

This special issue emphasizes teaching scientific writing in English classes. Nearly 20 authors have contributed short articles on techniques, goals and perspectives on teaching.

Special Publications on Mass Media Science Communication

Smith, Virginia Carter, and Alberger, Patricia L., eds. **Communicating University Research**. Washington, D.C.: Council for the Advancement and Support of Education, 1985.

This 137-page handbook is an updated version of an earlier one based on the proceedings of a fall 1980 conference conducted by CASE for university science writers. Includes summaries of talks and panel discussions and a reference list. Issues tackled include the importance of communicating university research, the public's perception of research, reaching specific audiences, handling controversial research, translating research language for the general public, and retaining journalistic credibility while serving institutional interests.

Friedman, Sharon M.; Dunwoody, Sharon; and Rogers, Carol L., eds. **Scientists and Journalists: Reporting Science As News**. New York: The Free Press, 1986.

Based on a series of science communication sessions at recent annual meetings of the American Association for the Advancement of Science, this book includes chapters by both scientists and journalists that describe the complexities of relationships between the two groups. Includes both empirical data and anecdotal accounts.

Goodfield, June. **Reflections on Science and the Media**. Washington, D.C.: American Association for the Advancement of Science, 1981.

Although more of a personal essay than a comprehensive look at the state of mass media science communication, this book raises a number of issues concerned with relationships between scientists and journalists. It also briefly describes a number of "case studies" where relationships became problematic.

Nowak, Paul F., ed. **Environmental Journalism: The Best of the Meeman Archive**. Ann Arbor, Mich.: The University of Michigan, 1988.

This 265-page book presents seven award-winning newspaper feature stories that address different environmental issues from across the U.S. Each feature is subdivided into six to 13 separate articles. Together these 70-plus articles were judged to be examples of the best environmental journalism produced in the U.S. since 1981. Several of the features spurred community or governmental action. Reporter biographies are included. Articles were selected from among 1000 articles on file in the Meeman Archive of environmental journalism, established by the Scripps Howard Foundation at The University of Michigan School of Natural Resources in Ann Arbor.

Popular Reporting of Agricultural Science: Strategies for Improvement. Proceedings of the National Agricultural Science Information Conference, Iowa State University, Ames, Iowa 1979.

This conference offered papers on a wide range of science communication topics. Included are remarks on the process and problems of science communication by scientists, farmers, science writers, and news consumers. (Papers from the conference are printed in *The ACE Quarterly* (Vol. 62, No. 4)).

SIPIscope, the newsletter of the Scientists' Institute for Public Information, 355 Lexington Avenue, New York, NY 10017.

Part of each bimonthly issue is devoted to science communication topics. Recent topics explored have included "Informing the Public: Why Bother?", "How the Media Cover Cancer," and "Why is Science Writing so Uncritical of Science?"

Special Issue on Interpreting Technology for the Nonspecialist. *IEEE Transactions on Professional Communication*, Vol. PC-25, December 1982.

This issue includes several articles on writing strategies useful in "translating" scientific languages into plain English.

Technology: The New Media Superstar. *Professional Engineer*, September 1981.

In this special issue five articles attempt to articulate the problems of communicating technology to the public. Some of the articles also deal with science communication in general.

Other Science Communication Bibliographies

Bowes, John E.; Stamm, Keith R.; Jackson, Kenneth M.; and Moore, Jeff. **Communication of Technical Information to Lay Audiences**. Seattle School of Communications, University of Washington, May 1978.

Reviews communication research relevant to the relationship between people and technology. The result is an excellent compilation of more than 160 studies.

Guillierie, Renee, and Schoenfeld, A. Clay. **An Annotated Bibliography of Environmental Communication Research and Commentary: 1969-1979**. Columbus ERIC/SMEAC Clearinghouse for Science, Mathematics, and Environmental Education, The Ohio State University College of Education and School of Natural Resources, 1200 Chambers Road, Columbus, Ohio 43212, 1979.

This bibliography covers 10 years of environmental communication research. With few exceptions, only articles published in refereed U.S. journals are abstracted. Each annotation includes a brief discussion of the problem, methodology, findings and conclusions.

This publication is the result of work sponsored by the
Michigan Sea Grant College Program with grant number
NA-86AA-D-SG043 from the National Sea Grant College Program,
National Oceanic and Atmospheric Administration (NOAA),
U.S. Department of Commerce, and funds from the State of Michigan.

Michigan Sea Grant is a cooperative program of
The University of Michigan and Michigan State University.

For additional copies of this publication, contact:

Michigan Sea Grant Communications
2200 Bonisteel Boulevard
The University of Michigan
Ann Arbor, MI 48109
(313)764-1138

MICHU-SG-87-900